US012144781B1

(12) **United States Patent**
Wang

(10) **Patent No.: US 12,144,781 B1**
(45) **Date of Patent: Nov. 19, 2024**

(54) **MASSAGE DEVICE**

(71) Applicants: **Dongguan Luose Electronic Technology Co., Ltd.**, Guangdong (CN); **Shenzhen Envision Technology Innovation Co., Ltd.**, Guangdong (CN)

(72) Inventor: **Dinghai Wang**, Guangdong (CN)

(73) Assignees: **Dongguan Luose Electronic Technology Co., Ltd.**, Dongguan (CN); **Shenzhen Envision Technology Innovation Co., Ltd.**, Shenzhen (CN)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **18/594,149**

(22) Filed: **Mar. 23, 2024**

(30) **Foreign Application Priority Data**

Jan. 12, 2024 (CN) 202410053759.X
Jan. 12, 2024 (CN) 202420089779.8

(51) **Int. Cl.**
A61H 7/00 (2006.01)

(52) **U.S. Cl.**
CPC ***A61H 7/004*** (2013.01); *A61H 2201/1207* (2013.01); *A61H 2201/14* (2013.01)

(58) **Field of Classification Search**
CPC A61H 7/004; A61H 7/002; A61H 7/00; A61H 7/005; A61H 19/00; A61H 19/30; A61H 19/34; A61H 23/00; A61H 23/006; A61H 23/02; A61H 23/0254; A61H 2201/12; A61H 2201/1207; A61H 2201/1215; A61H 2201/14
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

11,452,665	B1 *	9/2022	Yu	A61H 9/0057
11,833,100	B1 *	12/2023	Liu	A61H 9/0057
12,042,459	B1 *	7/2024	Liu	A61H 19/34
2020/0281808	A1 *	9/2020	Kirsten	A61H 23/04
2022/0110819	A1 *	4/2022	Guo	A61H 9/0057
2022/0409470	A1 *	12/2022	He	F04B 35/01

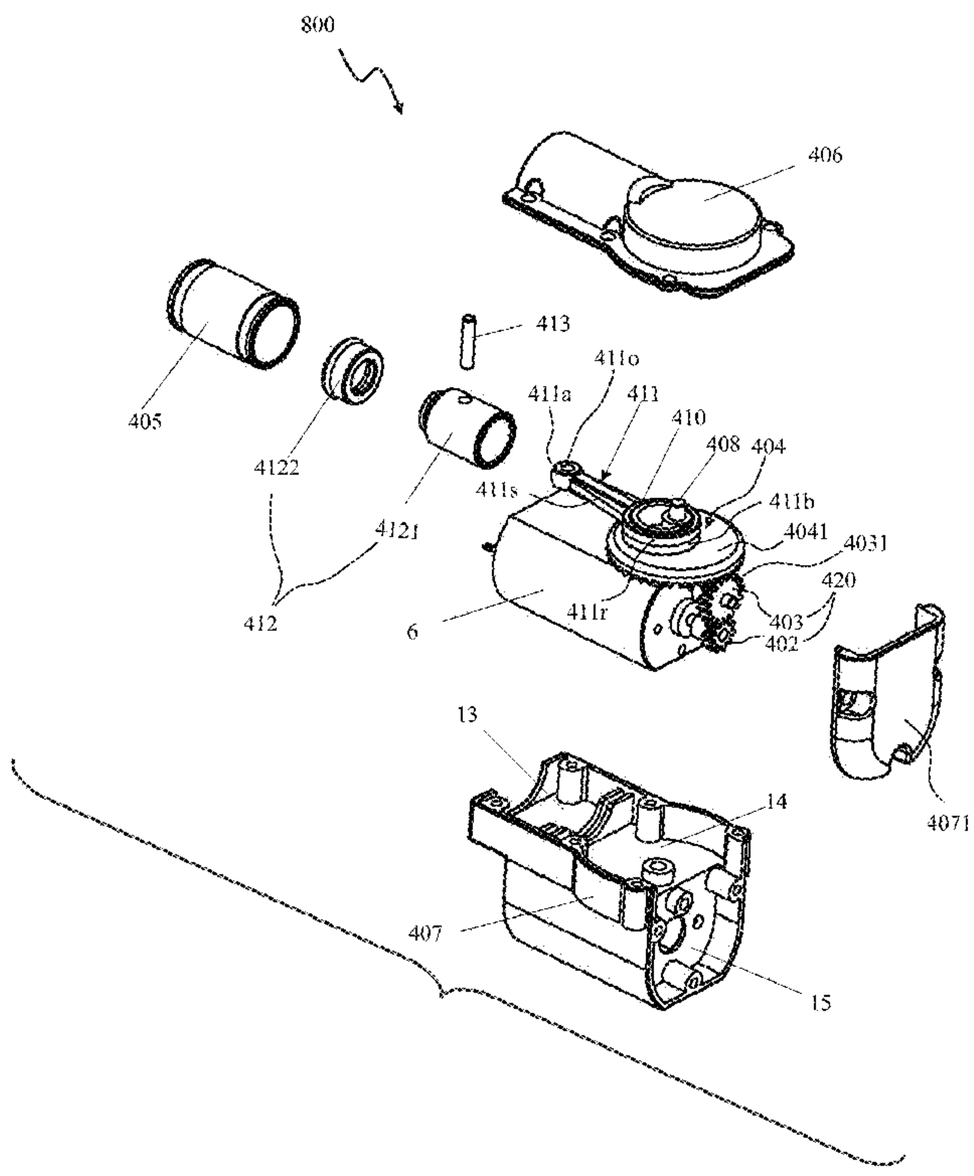
* cited by examiner

Primary Examiner — Colin W Stuart
(74) *Attorney, Agent, or Firm* — Yong Chen

(57) **ABSTRACT**

A massage device includes a housing, a massage sleeve having an opening, a transmission connection assembly, and a motor. The transmission connection assembly includes a guiding tube member, a piston movable axially inside the guiding tube member, an eccentric wheel, and a link component coupling the piston on a first end and with the eccentric wheel on a second end. The motor is coupled with the eccentric wheel via a gear assembly. When the massage device is in operation, the motor causes the piston to move axially inside the guiding tube member to change air pressure in the massage sleeve via the transmission connection assembly.

11 Claims, 4 Drawing Sheets



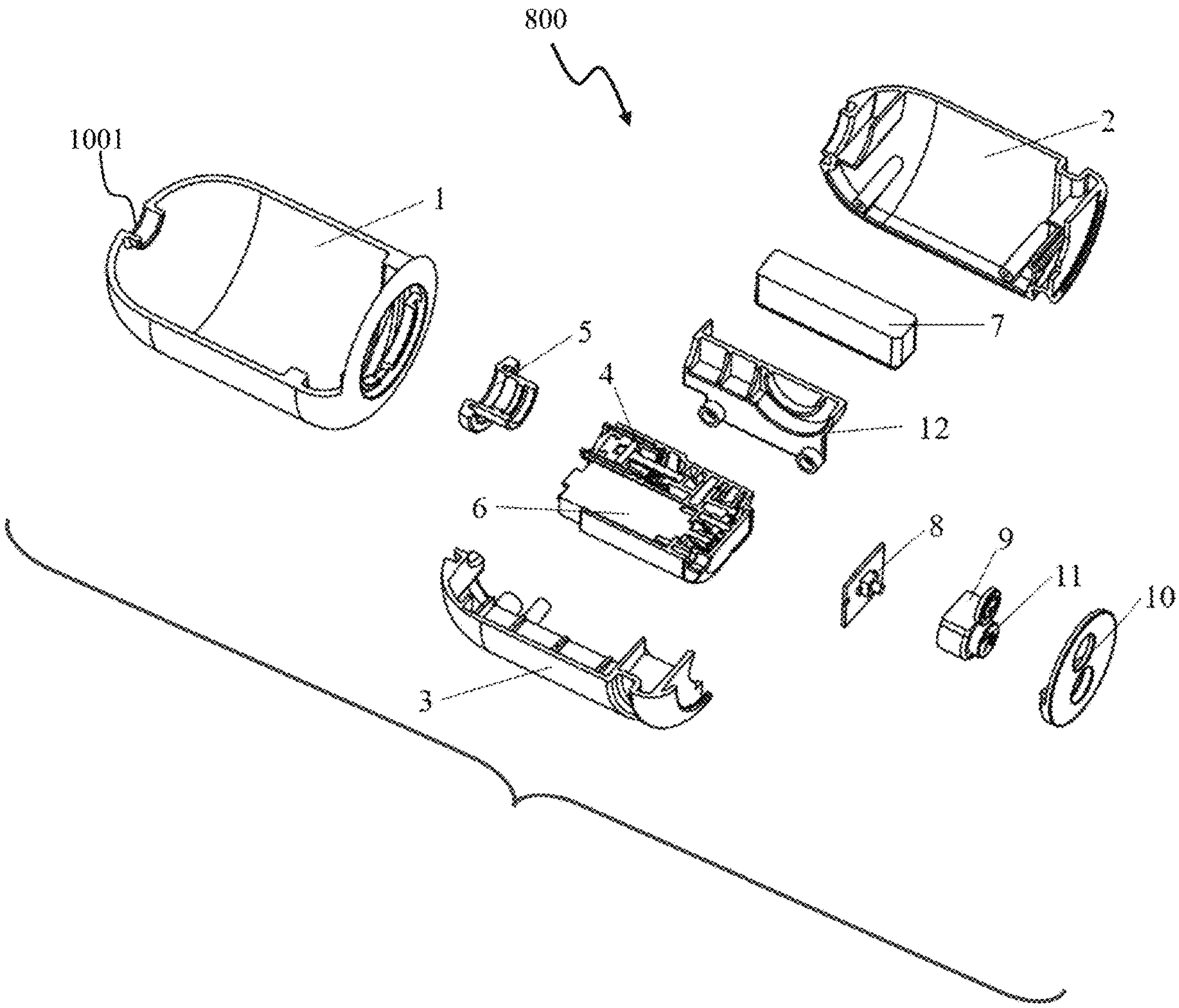


FIG. 1

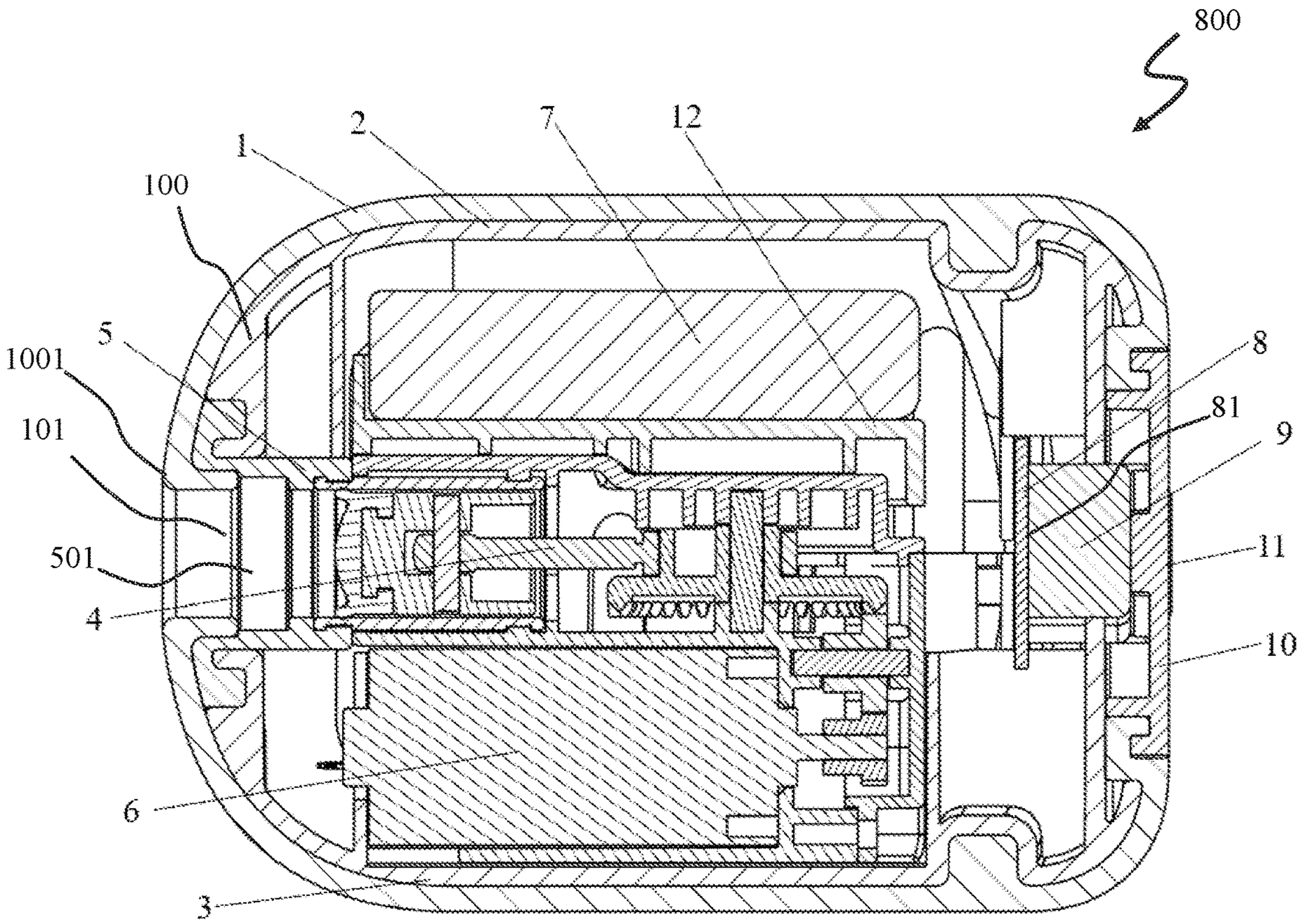


FIG. 2

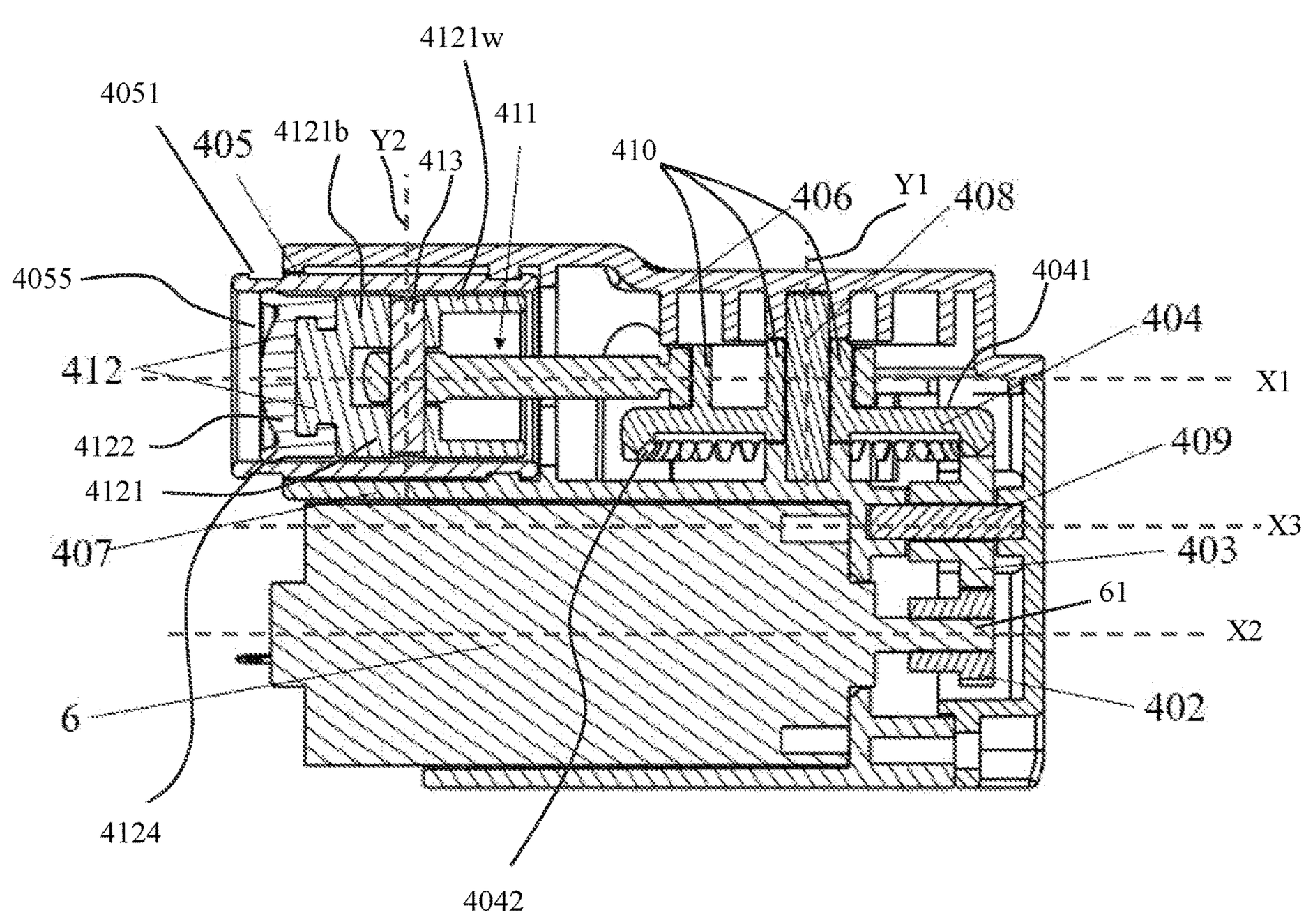

4121w
4051
405
4121b
Y2
413
411
410
406
Y1
408
4055
4041
404
412
X1
4122
409
4121
X3
407
403
61
X2
6
402
4124
4042

FIG. 3

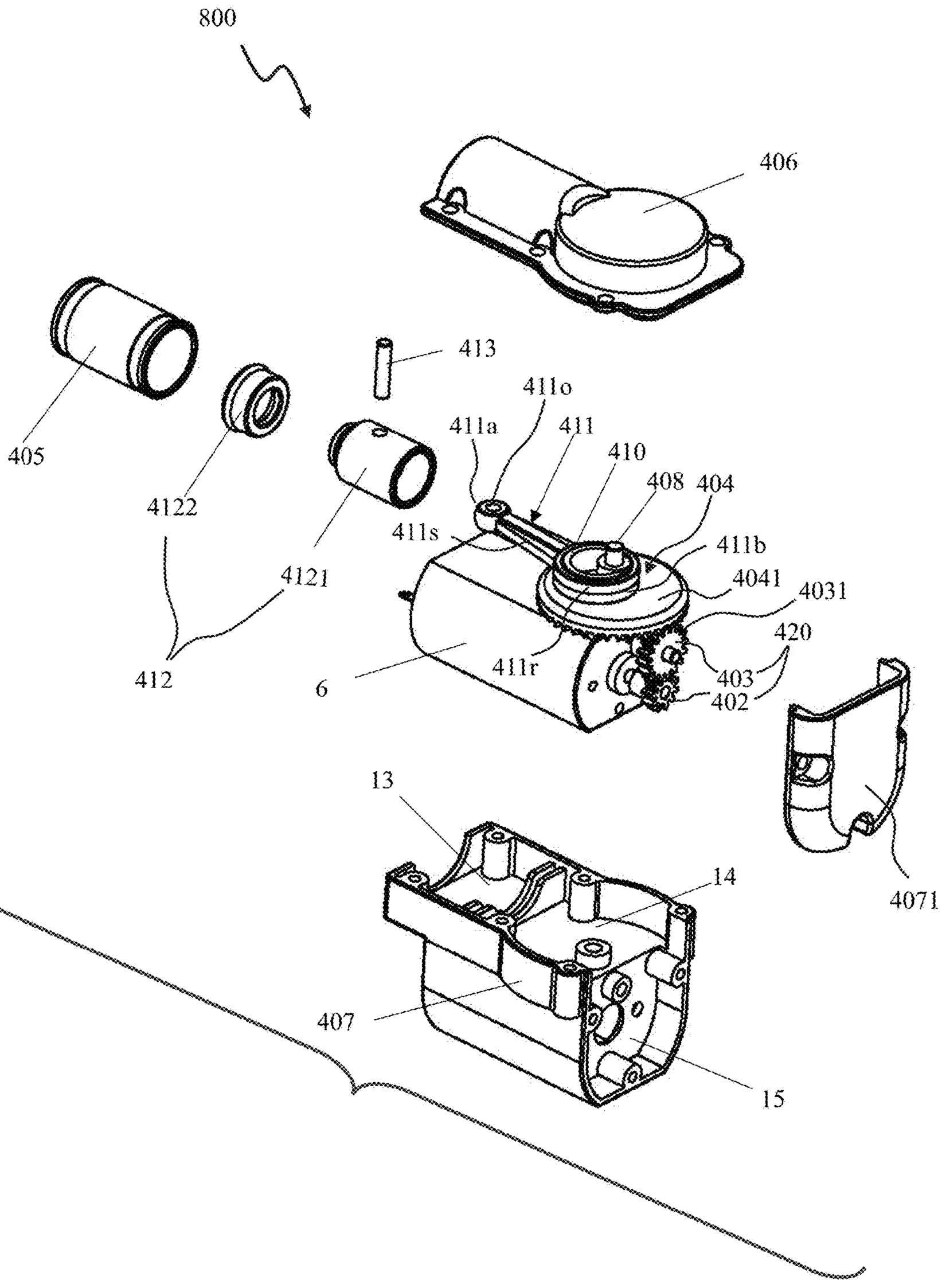

800
406
405
413
411o
411a
411
410
408
404
4122
411s
411b
4121
4041
4031
420
412
411r
403
6
402
13
14
4071
407
15

FIG. 4

MASSAGE DEVICE

TECHNICAL FIELD

The present invention relates to the field of healthcare massage products, specifically to a massager.

BACKGROUND

With the faster pace of life in modern society, more people experience stress and physical discomfort, and are eager to seek avenues to relieve and relax their bodies. By mimicking hand massaging motion and techniques, massage devices can provide muscle relaxation and relieve fatigue, and are becoming more popular.

Studies show that massage devices can have a variety of effects, such as relieving fatigue and tension, promoting blood circulation, and facilitating the discharge of waste and toxins from the body. They can also improve the level of physical health, and help reduce muscle pain, joint pain, headaches, etc.

SUMMARY OF THE INVENTION

In one aspect of the present invention, a massage device is provided, which comprises: (a) a housing; (b) a massage sleeve having an opening; (c) a transmission connection assembly including: a guiding tube member, a piston movable axially inside the guiding tube member along a long axis, an eccentric wheel, and a link component having a first end coupled with the piston and a second end coupled with the eccentric wheel; and (d) a motor that is coupled with the eccentric wheel of the transmission connection assembly and when in operation, drives the piston to move axially inside the guiding tube member along the long axis to change air pressure in the massage sleeve via the transmission connection assembly, wherein the housing includes an opening at one end, the opening aligned with and in air communication with the opening of the massage sleeve, wherein the massage sleeve is arranged at an end of the guiding tube member of the transmission connection assembly and aligned coaxially with the guiding tube member, wherein the transmission connection assembly and the motor are received inside the housing.

In some embodiments of the massage device, an end of the piston has a cross section matching a cross-section of the lumen enclosed in the guiding tube member.

In some embodiments, the piston includes a sealing cover coupled with a bottom of a plunging tube.

In some embodiments, the link component includes an elongated shaft portion and a circular portion connected to the elongated shaft portion. The elongated shaft portion can include an opening at an end which is coupled with the piston via a positioning pin. The circular portion can be coupled with a circular protruding section of the eccentric wheel.

In some embodiments, the eccentric wheel has a substantially flat major face parallel with the long axis along which the piston is movable inside the guiding tube member.

In some embodiments, the eccentric wheel can include a bottom edge comprising a first planar tooth pattern that meshes with a second tooth pattern on a circumferential periphery of a gear of a gear assembly driven by the motor. The gear assembly can include a driving gear coupled on an output shaft of the motor, and a driven gear having the tooth pattern on a circumferential periphery, the driven gear being coupled with, and driven by, the driving gear.

In some embodiments, the motor includes an output shaft defining a shaft rotation axis which is parallel to the long axis.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an exploded view of a massage device according to embodiments of the present invention.

FIG. **2** is a cross-sectional structural diagram of the massage device as shown in FIG. **1**.

FIG. **3** is an enlarged cross-sectional structural diagram of a part of the massage device as shown in FIG. **2**.

FIG. **4** is an exploded view of the partial structure of the massage device shown in FIG. **3**.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS

Certain embodiments of the present invention will be described below with reference to the accompanying drawings. Elements and features described in one figure or one embodiment of the invention may be combined with elements and features shown in one or more other figures or embodiments. It should be noted that for the purpose of clarity, the representation and description of structure/components not relevant to the present invention and known to those of ordinary skill in the art have been omitted from the drawings and description herein.

Embodiments of the present invention will be further described specifically with reference to FIGS. **1-4**.

As shown in FIGS. **1-4**, a massage device **800** of the present invention includes: a housing **100** (including an upper casing **2** and lower casing **3** which can be closed to form an enclosure by screws or other means commonly known in the art) having an opening **101** at one end (a left end shown in FIG. **2**), a massage sleeve **5**, a motor **6**, and a transmission connection assembly **4**. The transmission connection assembly **4** includes a guiding tube member **405**, a piston **412**, a link component **411**, and an eccentric wheel **404**. The piston **412** is movable axially inside the guiding tube member **405** along a long axis X**1**, and is connected to the link component **411**. The link component **411** is in turn connected to the eccentric wheel **404**, which is coupled with the motor **6** via a gear assembly **420**.

In more detail, the link component **411** includes two integrally formed parts, an elongated shaft portion **411***s* having a first end **411***a*, and a circular or ring portion **411***r* at a second end **411***b*. The ring portion **411***r* concentrically engages, via its inner face, with a top protruding circular portion **410** of the eccentric wheel **404** and can freely rotate about the protruding circular portion **410** along an axis Y**1** defined by an axial direction of the rotation shaft **408** of the eccentric wheel (which is perpendicular to the long axis X**1**). The elongated shaft portion **411***s* comprises an opening **4110** at the end **411***a*, and the opening **4110** is coupled with the piston **412** via a positioning pin **413**, which is embedded in an internal void of the piston **412**. The positioning pin **413** defines an axial axis Y**2** (which is parallel to the axis Y**1**), about which the elongated shaft portion **411***s* can rotate.

As the protruding circular portion **410** of the eccentric wheel **404** is not concentrically distributed around the shaft **408**, its rotation about the shaft **408** produces a crankshaft motion for the elongated shaft portion **411***s* of the link component **411**, thereby driving the piston **412** to move inside the guiding tube member **405** axially back and forth along the long axis X**1** due to the restriction of its movement by the guiding tube member **405** along this axial direction.

This is similar to how a piston is driven to move in a cylinder in an internal combustion engine.

The massage sleeve **5** can generally take the form of a hollow tube with open ends. As shown in the figures, it can have an opening **501** and be positioned at and concentrically coupled with an end **4051** of the guiding tube member **405**. The massage sleeve **5** is further coupled with the end opening **101** of the housing **100**. The opening **501** of the massage sleeve **5** is aligned and in air communication with the end opening **101** of the housing.

The fitting between the piston **412** and the inner wall surface of the guiding tube member **405** can be airtight while allowing smooth reciprocal sliding movement of the piston **412** within the guiding tube member **405**. An end **4124** of the piston **412** can have a cross section matching the cross-section of the lumen **4055** defined inside the guiding tube member **405**. The piston **412** can be integrally formed as a one-piece structure, or can include two parts fitted together as shown, including a sealing cover **4122** coupled with a bottom portion **4121***b* of a plunging tube **4121** which includes the bottom portion **4121***b* as well as a hollow cylinder portion **4121***w* extending from the bottom portion **4121***b*. The sealing cover **4122** slidably engages with the interior wall of the guiding tube member **405**, and can be made with rubbery or elastic material, for providing an airtight seal with the inner wall surface of the guiding tube member **405**.

As shown in FIGS. **3** and **4**, for secure placement of the various components in the housing, the massage device also includes a first (or upper) fixation shell **406** and a second (or lower) fixation shell **407** which can be coupled to each other by screws or in other ways commonly known in the art. A first cavity **13** and a second cavity **14** are enclosed by the first fixation shell **406** and the second fixation shell **407**. The guiding tube member **405** and a first part of the elongated shaft portion **411***s* of the link component **411** are disposed in the first cavity **13**. The guiding tube member **405** is fixedly mounted between the first fixation shell **406** and the second fixation shell **407**. A second part of the elongated shaft portion **411***s* and the circular portion of the **411***r* of the link component **411**, as well as the eccentric wheel **404** are disposed in the second cavity **14**. Enclosed by a third (rear) fixation shell **4071** and the second fixation shell **407**, the third cavity **15** houses the gear assembly **420** that comprises a driving gear **402** and **403**. The second fixation shell **407** also includes an internal void in which the motor **6** is tightly fitted.

The eccentric wheel **404** has a substantially flat major surface **4041** which is parallel with the long axis X**1**. On its reverse side, the eccentric wheel **404** has an outer edge with a substantially planar tooth pattern **4042**, which meshes with a tooth pattern **4031** on a circumferential periphery on the driven gear **403**, which rotates around its rotation shaft **409** and is coupled with a driving gear **402** mounted on an output shaft **61** of the motor **6**. The shaft **409** defines a rotation axis X**3** parallel to the axis X**2** defined by the output shaft **61** of the motor **6**. Collectively, the driving gear **402** and the driven gear **403** constitute gear assembly **420**. The way the gear assembly **420**, the eccentric wheel **404**, and the transmission connection assembly **4** are connected converts the rotation motion of the motor **6** to the linear motion of the piston **412** such that the piston **412** moves linearly in a direction parallel to the rotation axis of the output shaft **61** of the motor **6**.

To make the massage device compact in size, the components of the transmission connection assembly **4**, e.g., the piston **412**, the link component **411**, and the eccentric wheel **404** are connected in series generally in a direction along the long axis X**1** which is parallel to the rotational axis X**2** of the electric motor **6**. The motor is positioned side by side with the transmission connection assembly **4**, and the output shaft **61** of the motor **6** extends in a direction away from the massage sleeve.

For good hand feel and skin contact experience, a jacket **1** made of an elastic material, such as silicone or other flexible and soft material, can be disposed and wrapped around the outside of the housing **100**.

The massage sleeve **5** can be made from an elastic material such as silicone, or a hard material such as plastic or metal. The position of the massage sleeve **5** is not particularly limited. It can be positioned in the jacket **1** and coupled with the housing **100** as shown in the figures, or it can be integrally formed with the jacket **1** and extend into the housing **100**. It may also protrude to the outside of the housing **100** and/or the jacket **1** so that it may contact a target human body part directly.

As shown in the figures, the transmission connection assembly **4**, the gear assembly **420**, and the motor **6** can all be housed or received in the housing **100**.

As shown in the figures, the massage device can further include a battery holder **12** and a battery **7**, where the battery holder **12** is positioned inside the upper casing **2** and fits with the upper casing **2**. The battery **7** is fixedly positioned on the battery holder **12** and electrically coupled with a circuit board **8** to power the motor and electronic control components of the massage device. The circuit board **8** is also electrically coupled with the motor **6**. The battery **7** can be a rechargeable battery.

The circuit board **8** includes an on-board controller **81** configured to control the operation of the motor (e.g., start, stop, rotation speed/pattern). A button **9** is connected to the controller for activating the controller. An elastic key **11** engages with button **9**, and the rear cover **10** is provided with a through hole that corresponds to the elastic key **11** to allow the elastic key **11** to protrude outside the rear cover **10** for easy access by a user (e.g., by touching or pushing the key) to activate the controller to control the motor.

When in use, the opening **101** of the housing can be placed directly against a target skin surface of a human body (with the tip **1001** of the jacket **1** contacting the skin), e.g., the skin around a clitoris, to form an enclosed/sealed air chamber in the massage sleeve **5** and the lumen **4055** in the guiding tube member **405** bounded by the piston **412**. When the motor **6** is powered on and activated, the rotation of the output shaft **61** along the central axis X**2** of the motor **6** drives the driving gear **402**, which in turn drives the driven gear **403**, which in turn drives the eccentric wheel **404** to rotate along the shaft **408** (or axis Y**1**). The rotation of the top protrusion circular portion **410** of the eccentric wheel **404** causes the link component **411** to produce a crankshaft motion, driving the piston **412** to move inside the guiding tube member **405** axially back and forth along the long axis X**1**, thereby causing the air pressure in the massage sleeve to vary. This can create a massage or stimulation effect on the target part of the body, e.g., a clitoris, where the user can experience a sucking sensation by the varying air pressure. The massage effects can vary based on different movement speeds and patterns of the piston, which can be controlled by the controller.

The massage device of the present invention may further include at least one pair of one-way valves positioned on a barrier disposed between the massage sleeve and the piston. When the piston moves to the left, the first valve moves to the left and opens while the second valve remained closed;

and conversely, when the piston moves to the right, the second valve moves to the right and opens, while the first valve remains closed.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made without departing from the spirit and scope of the invention as defined by the appended claims. Furthermore, the scope of the present application is not limited to the specific embodiments of the apparatus, structure, processes, means, methods and steps described in the specification. Those of ordinary skill in the art will readily understand from the disclosure of the present invention that existing and existing devices that perform substantially the same functions or obtain substantially the same results as corresponding embodiments described herein may be used in accordance with the present invention. Accordingly, the appended claims are intended to include within their scope such processes, apparatus, means, methods or steps.

The invention claimed is:

1. A massage device, comprising:

(a) a housing;

(b) a massage sleeve having an opening;

(c) a transmission connection assembly including:

a guiding tube member, a piston movable axially inside the guiding tube member along a long axis, an eccentric wheel, and a link component having a first end coupled with the piston and a second end coupled with the eccentric wheel;

(d) a motor that is coupled with the eccentric wheel of the transmission connection assembly and includes an output shaft defining a shaft rotation axis which is parallel to the long axis, and when in operation, drives the piston via the transmission connection assembly to move axially inside the guiding tube member along the long axis to change air pressure in the massage sleeve,

wherein the housing includes an opening at one end, the opening aligned with and in air communication with the opening of the massage sleeve,

wherein the massage sleeve is arranged at an end of the guiding tube member of the transmission connection assembly and aligned coaxially with the guiding tube member, and

wherein the transmission connection assembly and the motor are received inside the housing.

2. The massage device of claim **1**, wherein an end of the piston has a cross section matching a cross-section of a lumen enclosed in the guiding tube member.

3. The massage device of claim **1**, wherein the piston comprises a sealing cover coupled with a bottom of a plunging tube.

4. The massage device of claim **1**, wherein the link component comprises an elongated shaft portion connected with a circular portion.

5. The massage device of claim **4**, wherein the elongated shaft portion comprises an opening at an end which is coupled with the piston via a positioning pin.

6. The massage device of claim **4**, wherein the circular portion is coupled with a top protruding circular section of the eccentric wheel.

7. The massage device of claim **4**, wherein the eccentric wheel has a flat major face parallel with the long axis along which the piston is movable inside the guiding tube member.

8. The massage device of claim **7**, wherein the eccentric wheel comprises a bottom edge comprising a first planar tooth pattern that meshes with a second tooth pattern on a circumferential periphery of a gear of a gear assembly driven by the motor.

9. The massage device of claim **8**, wherein the gear assembly comprises a driving gear coupled with an output shaft of the motor, and a driven gear having the second tooth pattern on a circumferential periphery, the driven gear being coupled with and driven by the driving gear.

10. A massage device, comprising:

(a) a housing;

(b) a massage sleeve having an opening;

(c) a transmission connection assembly including:

a guiding tube member, a piston movable axially inside the guiding tube member along a long axis, an eccentric wheel, and a link component having a first end coupled with the piston and a second end coupled with the eccentric wheel;

(d) a motor that is coupled with the eccentric wheel of the transmission connection assembly and when in operation, drives the piston via the transmission connection assembly to move axially inside the guiding tube member along the long axis to change air pressure in the massage sleeve,

wherein the housing includes an opening at one end, the opening aligned with and in air communication with the opening of the massage sleeve,

wherein the link component comprises an elongated shaft portion connected with a circular portion,

wherein the eccentric wheel has a flat major face parallel with the long axis, and comprises a bottom edge comprising a first planar tooth pattern that meshes with a second tooth pattern on a circumferential periphery of a gear of a gear assembly driven by the motor,

wherein the massage sleeve is arranged at an end of the guiding tube member of the transmission connection assembly and aligned coaxially with the guiding tube member, and

wherein the transmission connection assembly and the motor are received inside the housing.

11. The massage device of claim **10**, wherein the gear assembly comprises a driving gear coupled with an output shaft of the motor, and a driven gear having the second tooth pattern on a circumferential periphery, the driven gear being coupled with and driven by the driving gear.

* * * * *